

WHAT IS CLAIMED IS:

1. Magnetic powder composed of an alloy composition represented by  $R_x(Fe_{1-y}Co_y)_{100-x-z-w}B_zNb_w$  (where R is at least one kind of rare-earth element, x is 7.1 - 9.9at%, y is 0 - 0.30, z is 4.6 - 6.9at%, and w is 0.2 - 3.5at%), the magnetic powder being constituted from a composite structure having a soft magnetic phase and a hard magnetic phase, wherein the magnetic powder has magnetic properties in which, when the magnetic powder is formed into an isotropic bonded magnet by mixing with a binding resin and then molding it, the irreversible susceptibility ( $\chi_{irr}$ ) which is measured by using an intersectioning point of a demagnetization curve in the J-H diagram representing the magnetic properties at the room temperature and a straight line which passes the origin in the J-H diagram and has a gradient (J/H) of  $-3.8 \times 10^{-6} H/m$  as a starting point is equal to or less than  $5.0 \times 10^{-7} H/m$ , and the intrinsic coercive force ( $H_{cJ}$ ) of the bonded magnet at the room temperature is in the range of 320 - 720 kA/m.

2. The magnetic powder as claimed in claim 1, wherein when the magnetic powder is formed into an isotropic bonded magnet having a density  $\rho$  [ $Mg/m^3$ ] by mixing with a binding resin and then molding it, the remanent magnetic flux density  $Br[T]$  at the room temperature satisfies the relationship represented by the formula of  $Br/\rho [ \times 10^{-6} T \cdot m^3/g ] \geq 0.125$ .

3. The magnetic powder as claimed in claim 1 ~~or 2~~, wherein when the magnetic powder is formed into an isotropic bonded magnet by mixing with a binding resin and then molding it, the absolute value of the irreversible flux loss (initial flux loss) is equal to or less than 6.2%.

4. The magnetic powder as claimed in ~~any one of~~ claims 1 to 3, wherein said R comprises rare-earth elements mainly containing Nd and/or Pr.

5. The magnetic powder as claimed in ~~any one of claims 1 to 4~~, wherein said R includes Pr and its ratio with respect to the total mass of said R is 5 - 75%.

6. The magnetic powder as claimed in ~~any one of claims 1 to 5~~, wherein said R includes Dy and its ratio with respect to the total mass of said R is equal to or less than 14%.

7. The magnetic powder as claimed in ~~any one of claims 1 to 6~~, wherein the magnetic powder is obtained by quenching the alloy of a molten state.

8. The magnetic powder as claimed in ~~any one of claims 1 to 7~~, wherein the magnetic powder is obtained by milling a melt spun ribbon of the alloy which is manufactured by using a cooling roll.

9. The magnetic powder as claimed in ~~any one of claims 1 to 8~~, wherein the magnetic powder is subjected to a heat treatment for at least once during the manufacturing process or after its manufacture.

10. The magnetic powder as claimed in ~~any one of claims 1 to 9~~, wherein the average particle size of the magnetic powder lies in the range of 0.5 - 150 $\mu$ m.

11. An isotropic bonded magnet formed by binding a magnetic powder containing Nb with a binding resin, wherein the isotropic bonded magnet is characterized in that the irreversible susceptibility ( $\chi_{irr}$ ) which is measured by using an intersectioning point of a demagnetization curve in the J-H diagram representing the magnetic properties at the room temperature and a straight line which passes the origin in the J-H diagram and has a gradient (J/H) of  $-3.8 \times 10^{-6}$  H/m as a starting point is less than  $5.0 \times 10^{-7}$  H/m, and the intrinsic coercive force ( $H_{CJ}$ ) of the magnet at the room temperature is in the range of 320 - 720 kA/m.

12. The isotropic bonded magnet as claimed in claim 11, wherein when the density of the isotropic bonded magnet is  $\rho$  [Mg/m<sup>3</sup>], the remanent magnetic flux density Br[T] at the room temperature satisfies the relationship represented by the formula of  $Br/\rho \geq 0.125$  [ $\times 10^{-6}$  T·m<sup>3</sup>/g].

A 13. The isotropic bonded magnet as claimed in claim 11 ~~or 12~~, wherein said magnetic powder is formed of R-TM-B-Nb based alloy (where R is at least one rare-earth element and TM is a transition metal containing Iron as a major component thereof).

A 14. The isotropic bonded magnet as claimed in ~~any one of claims~~ 11 ~~to 13~~, wherein the magnetic powder is composed of an alloy composition represented by  $R_x(Fe_{1-y}Co_y)_{100-x-z-w}B_zNb_w$  (where R is at least one kind of rare-earth element, x is 7.1 - 9.9at%, y is 0 - 0.30, z is 4.6 - 6.9at%, and w is 0.2 - 3.5at%).

AA 15. The isotropic bonded magnet as claimed <sup>in</sup> claim 13 ~~or 14~~, wherein said R comprises rare-earth elements mainly containing Nd and/or Pr.

A 16. The isotropic bonded magnet as claimed in ~~any one of claims~~ 13 ~~to 15~~, wherein said R includes Pr and its ratio with respect to the total mass of said R is 5 - 75%.

A 17. The isotropic bonded magnet as claimed in ~~any one of claims~~ 13 ~~to 16~~, wherein said R includes Dy and its ratio with respect to the total mass of said R is equal to or less than 14%.

A 18. The isotropic bonded magnet as claimed in ~~any one of claims~~ 11 ~~to 17~~, wherein the average particle size of the magnetic powder lies in the range of 0.5 - 150 $\mu$ m.

A 19. The isotropic bonded magnet as claimed in ~~any one of claims~~ 11 ~~to 18~~, wherein the absolute value of the irreversible flux loss (initial flux loss) is equal to or less than 6.2%.

- A 20. The isotropic bonded magnet as claimed in ~~any one of claims~~  
A 11 to 19, wherein the magnetic powder is constituted from a  
composite structure having a soft magnetic phase and a hard  
magnetic phase.
- A 21. The isotropic bonded magnet as claimed in ~~any one of claims~~  
A 11 to 20, wherein the isotropic bonded magnet is to be subjected  
to multipolar magnetization or has already been subjected to  
multipolar magnetization.
- A 22. The isotropic bonded magnet as claimed in ~~any one of claims~~  
A 11 to 21, wherein the isotropic bonded magnet is used for a motor.

EPSON 2000-00926